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The impact of patent litigation on shareholder value in the IT industry

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The Impact of Patent litigation on Shareholder value
in the IT industry

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Abstract

In recent years, patent lawsuits in the IT industry have become a sensitive issue. While numerous studies have investigated the wealth effect of patent and corporate litigation, few studies have examined the current patent litigation in the IT industry. This paper investigates the wealth effect of patent lawsuits using an event study method. This paper hypothesizes that a firm which initiates a lawsuit experiences more of a positive return than a rival firm when the patent lawsuit filing is announced, as a firm will initiate a lawsuit when they are convinced that they have a vantage position in the patent lawsuit. The empirical results show that a firm which has a vantage position in a patent lawsuit experiences a positive stock price return when they sue a rival firm for patent infringement and that a firm which does not have a vantage position in a patent lawsuit experiences a negative stock price return when they are sued by a rival firm. The empirical results support that a vantage position in patent litigation is the one of the key factors to explain the wealth effect of patent litigation. This paper suggests that action to increase patent competency to reach a vantage position in a patent war is one of the ways to increase shareholder value.

Key words: Patent litigation, Event study, Intellectual property, Litigation cost

1. Introduction

In recent years, numerous instances of patent litigation have occurred in the IT industry. Since the San Jose case in April of 2011, Apple and Samsung have filed more than thirty such lawsuits against each other in ten countries. After these numerous lawsuits between Apple and Samsung, the subsequent verdict of August of 2012 was intriguing in. The verdict of the court announced that Samsung was guilty of infringing on six Apple patents. As a result of this decision, Samsung was ordered to pay more than one billion dollars to Apple as compensation for patent infringement. After the announcement of this news, the stock price of Samsung decreased by almost 5% while Apple's stock price increased by 2%. Therefore, this situation shows that patent lawsuit results can have a major effect on companies. If the impact of the results of a patent lawsuit is large, the impact of filing a patent lawsuit would also be significant either positively or negatively because the stock price reflects future value. Consequently, this paper examines the impact of the patent litigation on shareholder wealth in an event study taking into account the patent lawsuit filing dates. Furthermore, this paper is not confined to Apple and Samsung, as it includes cases involving other cellular phone manufacturing firms. For example, Nokia and Apple also filed patent lawsuits against each other over the last two years, and other Android manufactures such as Motorola and HTC have brought suits against Apple.

Patent lawsuits in the IT industry have more of an effect compared to those in other industries for the following reasons. First, a high-tech company which has a high investment proportion to R&D is apt to be damaged relatively more from a patent lawsuit. Bessen and Meurer (2007) showed that R&D-intense defendant firms experience more negative returns than other firms. Second, firms in the IT industry always have the potential to infringe on patents because one IT device, such as a smart phone, includes thousands of patented technologies. Briefly, a firm in the IT industry is not only highly to be involved in patent infringement lawsuit but also suffers from a higher negative return

than other industry firms when they are sued. For these reasons, it is necessary to determine the impact of a patent lawsuit on firms in the IT industry.

Bessen and Meurer (2007) performed an event study to measure the effect of patent litigation with large samples, showing that the impact of patent litigation on the value of a firm depends on the firm's characteristics, such as the size and the firm's financial conditions. Bhagat, Bizjak, and Coles (1998), Lerner (1995), Meurer (1989), and Bessen and Meurer (2006) also discussed this issue. However, there is a lack of research which investigates the wealth effect of continuous lawsuits between two firms such as recent patent lawsuit filings in the IT industry. In such a case, being on the plaintiff or defendant side does not fully explain the wealth effect of a lawsuit because a firm always has a chance to be a plaintiff or a defendant. This paper also suggests that the wealth effect of a patent lawsuit filing in the IT industry can be explained by which firm initiates the lawsuit. For the firm which initiates the lawsuit, a positive wealth effect caused by the patent litigation ensues. Shareholders expect that a firm which initiates a lawsuit has a higher possibility to win, as they would not have initiated the lawsuit if this were not the case. The purpose of this paper is to examine whether there exists any impact of patent litigation on the value of plaintiff or defendant firms in the IT industry. The paper also examines whether the act of initiating the lawsuit has an influence on the wealth effect of the patent litigation filing announcement by the firm.

This paper is organized as follows. After reviewing previous studies related to the impact of patent litigation in section 2, this paper presents the research methodology and data in section 3. Section 4 represents the empirical results, and the conclusion is given in section 5.

2. The impact of patent litigation: Hypothesis

2.1. The impact of corporate litigation

Engelmann and Cornell (1988) investigated the wealth effect associated with filings, settlements, and verdicts using five interfirm dispute samples and observed the combined wealth losses incurred by the litigating parties. Bhagat, Brickley and Coles (1994) examined the impact of lawsuit filings and settlements on shareholder value using a much larger sample which included 550 interfirm disputes, also finding combined wealth losses. Ellert (1975) examined market reactions to lawsuit announcements pertaining to mergers and antitrust actions in 1950-1972 and found a negative return on the firm value of defendants. Bhagat, Bizjak and Coles (1998) also studied the impact of a lawsuit on shareholder value with a large sample of lawsuits, including 920 lawsuit filings or settlement cases, finding wealth losses for the defendant firm. The empirical results of these studies regarding corporate lawsuits showed that the wealth effect of litigation is generally negative. When news of a lawsuit filing was announced in the past, the stock prices of both the plaintiff and defendant firms decreased. In particular, the negative effect on the defendant firms was significant more statistically.

2.2. The impact of patent litigation

Some research showed that the wealth effect of patent lawsuit cases is not much different from that of other corporate litigation. Bhagat, Bizjak and Coles (1998), using an event study, showed that the wealth effect of patent litigation is negative for defendant firms and insignificant for plaintiff firms. Lerner (1995) investigated the wealth effect of patent litigation on biotechnology firms and found a negative effect on stock prices. Bessen and Meurer (2007) examined the negative impact of a patent lawsuit on shareholder value using a large sample based on the date of the filing of the lawsuit for US public firms from 1984 to 1999. The results showed that the patent litigation filing

announcement has a negative effect on defendant firms, after controlling certain factors pertaining to firm characteristics. Based on these findings, the wealth effect of patent litigation is not very different from that of other corporate lawsuits.

The negative effect of patent litigation is reflected in the direct and indirect costs of patent litigation. The direct costs include only the litigation costs, such as attorney fees and the award cost of patent infringement. The indirect costs include other costs, such as decreased brand image and disruption of the firm's activity during litigation. However, there is also a positive effect of patent litigation. For example, if shareholders expect some benefits from the patent litigation, such as patent royalties, a patent litigation filing announcement will have a positive impact on the stock price. At this point, we discuss the positive and negative effects of a patent lawsuit filing announcement on the defendant and plaintiff firms.

2.3. The impact of brand attitude and patent lawsuit filing announcement

Patent litigation has an impact on a firm's brand image. When Samsung was sued by Apple, initially many newspapers reported that 'Samsung is a copycat.' This likely decreased Samsung's brand image and increased Apple's brand image. This impact on brand image is related to the stock price. Aaker and Jacobson (2001) found that the changes in brand attitude are associated contemporaneously with stock returns and lead accounting financial performance. An event which has an effect on brand attitude in a positive or negative way would impact firm value positively or negatively. Chaney, Devinney and Winer (1991) found that the announcement of a new product has a positive effect on firm value, and Jarrell and Peltzman (1985) found that a firm experiences a negative stock return when they are related to product problems as drivers of brand attitude.

This is analogous to the case of a lawsuit. Alexander (1999) studied the relationship

between corporate crime and reputational penalties, showing that firms experience reputational losses when they are linked to corporate crime. Karpoff and Lott (1993) also showed that the initial news announcement that a firm is a defendant in a lawsuit has a significant negative impact on shareholder value and that shareholder value losses by the defendant firm are larger than the total direct costs. This additional loss is the reputational cost. Prince and Rubin (2002) investigated the wealth effect of product liability litigation in the automobile and pharmaceutical industries and suggested that there are reputation effects by lawsuits for the defendant firm. These previous studies show that a patent lawsuit filing announcement affects brand attitude negatively.

A patent lawsuit filing announcement also affects brand attitude positively. Bessen and Meurer (2007) noted that when a firm is sued, investors may view this as a sign that its technology has been successful. For example, if Samsung's Galaxy series' sales had not been successful, Apple would not have sued Samsung, according to this line of reasoning. In this case, the patent litigation announcement affects the brand attitude of the defendant firm positively. Otherwise, a patent lawsuit filing announcement can also affect the plaintiff firm's brand attitude positively. Austin (1993) found that a patent announcement had a positive effect on shareholder value and that patent lawsuit filing announcements are related to patent announcements. In the IT industry, each device can include thousands of patents, meaning that it is not easy to account for each patent for normal users. When a patent litigation filing is announced, people assume that the plaintiff firm has the patent. This announcement also implies that this patent is valuable and the technology included that patent is successful. Based on this, a patent litigation announcement would affect the plaintiff firm's brand attitude positively.

This paper explains the impact of a patent lawsuit filing announcement by investigating brand attitude. If the effect on the stock price is positive or negative, this implies that the positive or negative effect of the brand attitude is significant.

2.4. The vantage position of patent litigation

A firm which initiates patent litigation would experience more positive effect by the patent lawsuit filing announcement than the rival firm. Lerner (1995) found, based on empirical results, that firms that expect high litigation costs will have a tendency to avoid litigation. Based on this result, a firm tends to investigate which firm is in the vantage position in the case of patent litigation before initiating any type of patent litigation. If the firm concludes that it is not in a vantage position, they will not sue. Moreover, the IT industry firm has a higher probability of patent infringement regardless of intentions because each IT device, such as a smart phone, includes numerous patents. This can increase the likelihood that a lawsuit is withheld when a suing firm does not have a vantage position in the lawsuit. Thus, a firm which initiates a lawsuit can be regarded to enjoy a vantage position. The firm in the vantage position has a higher possibility to win the lawsuit, and the prospect of winning reinforces the positive effect of the patent lawsuit announcement.

3. Methodology and data

3.1. Data

We collected the lawsuit filing announcement date data from the Lexis-Nexis news database. This paper focuses on patent litigation effects in IT industry firms between Apple and other cellular phone manufacture firms. Therefore, we used the keywords ‘Apple’ and ‘Patent’ to find news data that includes patent lawsuit filings between Apple and other firms from October of 2009 (the date of the first patent litigation begin between Nokia and Apple) to June of 2012. This paper did not include duplicated dates or those are too close to other event dates, such as lawsuit verdicts, which can influence the original impact of the patent lawsuit filing. Table 1 shows 27 patent lawsuit filing announcement dates for a total of 54 cases because each lawsuit filing involves two firms.

The data can be divided into three cases: Nokia-Apple cases, Apple-HTC cases, and Apple-Samsung cases. The securities price data were collected from *Dataguide*.

3.2. Methodology: Event study

We use an event study methodology to find the impact of the filing of patent litigation on shareholder value. Many research papers have noted an impact of corporate litigation on firm value using the event study methodology. Bhagat (2002) reviewed many papers which investigated corporate litigation using an event study, and suggested that an event study is a useful method when seeking to find the impact of corporate litigation. This paper also uses an event study to find the impact of the filing of patent litigation.

The event study methodology is based on the semi-strong form of the efficient market hypothesis. The semi-strong form means that equity price should reflect all publicly available information. A particular event available publicly should have a significantly effect on stock prices. If the stock price reacts before the announcement date, there may have been information leakage. In such a situation, the stock price may show abnormal fluctuations a few days before the announcement due to information leakage.

Information leakage does not arise in all events. The impact of an event on the occurrence of abnormal returns may appear a few days after the announcement and may last for days.

This paper estimates the abnormal returns of plaintiff and defendant firms due to patent lawsuit filing announcement events using the statistical market model. This market model is derived from the difference between the return of a particular security and the market portfolio. The market model is as follows:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (1)$$

Here, R_{it} is the return of the security i at time t , R_{mt} is the corresponding return of the market portfolio at time t , and α_i and β_i are the market model parameters obtained from the ordinary least-squares (OLS) regression method. The abnormal returns are estimated using *Dataguide* daily market indices for the estimation period from 250 days to 45 days ($t = -250, -45$) before the announcement date ($t = 0$). If an unexpected event occurred on day t , there may be an abnormal return for security i around that day. The total impact of the event can be found by accumulating the abnormal returns (CARs) in the event window. This paper implements a single regression to check whether the CARs of each window are statistically different from zero.

Table 1. Patent lawsuit filing announcement date form Lexis-Nexis database

Date	Plaintiff	Defendant
2009-10-22	Nokia	Apple
2009-12-11	Apple	Nokia
2009-12-29	Nokia	Apple
2010-02-20	Apple	Nokia
2010-03-02	Apple	HTC
2010-05-04	Nokia	Apple
2010-05-13	HTC	Apple
2010-09-01	Apple	Nokia
2010-12-17	Nokia	Apple
2011-03-29	Nokia	Apple
2011-04-19	Apple	Samsung
2011-04-22	Samsung	Apple
2011-06-25	Apple	Samsung
2011-07-01	Samsung	Apple
2011-07-07	Apple	Samsung
2011-07-12	Apple	HTC
2011-08-17	HTC	Apple
2011-09-13	Samsung	Apple
2011-09-18	Samsung	Apple
2011-09-26	Samsung	Apple
2011-10-05	Samsung	Apple
2012-02-02	Apple	Samsung
2012-02-09	Apple	Samsung
2012-03-08	Samsung	Apple
2012-04-06	Apple	Samsung
2012-04-20	Samsung	Apple
2012-06-07	Apple	Samsung

4. Results

This paper first examines the effects of patent lawsuit filing announcements on the both plaintiff and defendant firm, and then investigates whether the wealth effect of a patent lawsuit filing depends on who initiates the lawsuit. To investigate this effect, the firms are separated into two groups: the *Original Plaintiff firm* and the *Original Defendant firm*. Table 2 shows the two groups, i.e., the firms which initiate the lawsuit as the Original Plaintiff firm group and the rival firm as the Original Defendant firms.

An empirical analysis shows several interesting results. The empirical results are divided into nine groups and Table 3 shows the results of the cumulative abnormal returns of each group in each window. The difference between ‘Plaintiff’ group and ‘Original Plaintiff’ group is that ‘Plaintiff’ group includes all plaintiff cases while the ‘Original Plaintiff’ group includes all cases in the *Original Plaintiff firm* group regardless of plaintiff or defendant. The difference between ‘Defendant’ group and ‘Original Defendant’ group is also likewise. The ‘Plaintiff OP’ group only indicates the plaintiff firms in the *Original Plaintiff firm* group. Also, the ‘Plaintiff OD’ group only indicates the defendant firms in the *Original Defendant firm* group. The ‘Defendant OP’ group and ‘Defendant OD’ group is likewise.

Table 2. The group of firm in patent lawsuit filing event

Original Plaintiff firm	Original Defendant firm
Nokia	Apple
Apple	HTC
Apple	Samsung

Table 3. Cumulative abnormal return, (T-value) results.

Window	N	(0,0)	(0,1)	(-1,0)	(-1,1)	(-1,2)	(-1,3)	(-1,4)
All (1)	54	0.0013 (0.58)	-0.0003 (-0.09)	-0.0001 (-0.02)	-0.0017 (-0.44)	0.0003 (0.09)	0.0040 (0.78)	0.0086 (1.45)
Plaintiff (2)	27	0.0046 (1.32)	0.0068* (1.90)	0.0054 (0.322)	0.0076 (1.59)	0.0105** (2.15)	0.0140** (2.16)	0.0177** (2.49)
Defendant (3)	27	-0.0019 (-0.65)	-0.0074 (-1.45)	-0.0055 (-1.34)	-0.0110* (-1.97)	-0.0098* (-1.72)	-0.0066 (-1.04)	-0.0019 (-0.24)
Original Plaintiff (4)	27	0.0032 (1.31)	0.0049 (1.33)	0.0018 (0.42)	0.0035 (0.69)	0.0056 (0.95)	0.0122* (1.95)	0.0179** (2.65)
Original Defendant (5)	27	-0.0005 (-0.14)	-0.0054 (-1.04)	-0.0020 (-0.36)	-0.0069 (-1.19)	-0.0049 (-0.92)	-0.0049 (-0.73)	-0.0021 (-0.25)
Plaintiff OP# (6)	14	0.0032 (1.04)	0.0069 (1.70)	0.0049 (0.95)	0.0086* (1.83)	0.0119** (2.34)	0.0137* (1.85)	0.0172** (2.18)
Plaintiff OD## (7)	13	0.0061 (0.93)	0.0068 (1.08)	0.0059 (0.60)	0.0065 (0.75)	0.0090 (1.02)	0.0143 (1.27)	0.0183 (1.47)
Defendant OP# (8)	13	0.0032 (0.80)	0.0027 (0.43)	-0.0016 (-0.22)	-0.0020 (-0.23)	-0.0012 (-0.11)	0.0107 (1.00)	0.0187 (1.61)
Defendant OD## (9)	14	-0.0067 (-1.62)	-0.0168** (-2.35)	-0.0092* (-2.02)	-0.019*** (-3.11)	-0.017*** (-4.62)	-0.022*** (-5.72)	-0.0210** (-2.44)

* p<0.1, ** p<0.05, *** p<0.01

OP = Original Plaintiff, ## OD = Original Defendant

The first group is the 'All' group, which includes all patent lawsuit filing events in the CARs data. There is no statistically significant result. This result might be due to the fact that plaintiff firm and the defendant firm could experience different pattern of returns when the patent lawsuit filing news is announced. Unless one effect is dominant, the combined return of the two firms could be statistically insignificant.

The second group is the 'Plaintiff' group. The impact of a patent lawsuit filing announcement is statistically significant at the 5% and 10% levels, which implies that the plaintiff firm experiences a positive stock price return when the patent lawsuit filing news is announced. One possible explanation for this result is that the positive effect on the stock price is greater than the negative effect. The positive wealth effect might be due to the improvement of brand attitude and the negative wealth effect might be caused by the direct and indirect costs.

The third group is the 'Defendant' group. The impact of a patent lawsuit filing announcement is statistically significant at the 10% level, which implies that the defendant firm experiences a negative stock price return when the patent lawsuit filing news is announced. However, statistical significance at the 10% level is not strong enough to conclude that the impact of patent lawsuit filing announcement is negative on the stock price.

The fourth group is the 'Original Plaintiff' group. The impact of the patent lawsuit filing announcement is statistically significant at the 5% and 10 % levels, which means that firms which initiate patent lawsuits experience positive stock price returns when the patent lawsuit filing news is announced. This result is quite different from the 'All' group result, which was not statistically significant. A firm which initiates a lawsuit has a vantage position in the case of patent litigation and this might reinforce the positive effect of the patent lawsuit announcement. This could explain the difference between the two groups.

The fifth group is the 'Original Defendant' group. For this group, there are no

statistically significant results. This result is similar to the 'All' group result which is also statistically insignificant. This result might be consistent with the fact that it is very difficult for the firm, which does not have a vantage position in the patent lawsuit to experience a positive effect of a patent lawsuit filing than the rival firm.

The sixth group is the 'Plaintiff OP' group. The impact of a patent lawsuit filing announcement is statistically significant at the 5% and 10% levels, which means that a plaintiff firm in the '*Original Plaintiff firm*' group experiences a positive return when the patent lawsuit filing news is announced.

The seventh group is the 'Plaintiff OD' group. In this case, there is no statistically significant effect on the stock price. One possible explanation for the different results for the 'Plaintiff OP' and 'Plaintiff OD' groups is that the degree of the positive effect on the plaintiff firm's stock price depends on whether the firm initiates the lawsuit or not.

The eighth and ninth groups are the 'Defendant OP' group and 'Defendant OD' group. The impact of a patent lawsuit filing announcement is statistically significant at the 1% and 5% levels for the 'Defendant OD' group, while it is not statistically significant for the 'Defendant OP' group. This result implies that the defendant firm in the *Original Defendant firm* group experiences a negative stock return when the patent lawsuit filing news is announced, but there is no evidence regarding the defendant firm's stock price return in the *Original Plaintiff firm* group. This result suggests that the degree of negative wealth effect on the defendant firm also depends on whether the firm initiates the lawsuit or not.

Summarizing the result of the empirical analysis, first, plaintiff firms expect a positive wealth effect when the patent lawsuit filing news is announced. However, there is no evidence that this positive wealth effect is applied to the plaintiff firm in the *Original Defendant firm* group. This result suggests that the degree of the positive effect on the plaintiff firm would depend on the vantage position in a patent lawsuit. Second, the defendant firm expects a negative wealth effect, and this negative effect is notably

observed in the defendant case in the *Original Defendant firm* group. Contrary to the negative effect of the 'Defendant OD' group, the result for the 'Defendant OD' group show insignificant effects, and the firm in the *Original Plaintiff firm* group expect a positive return even when they are sued by an apposition firm. This results suggest that initiating a lawsuit may dilute the negative effect on the defendant firm.

5. Conclusion

This paper investigates the impact of patent litigation on firm value in the IT industry. Previous empirical results showed that patent litigation had a negative wealth effect on the value of defendant firm and that there is no statistically significant return for the plaintiff firm. However, this paper finds that a patent lawsuit filing announcement has a positive impact on the plaintiff firm and a negative impact on the defendant firm. This paper also investigates whether the initiation of a lawsuit has an influence on the effect of patent litigation. The result shows that the firm which initiates the lawsuit experiences a positive stock return when the firm is in the plaintiff position and that the rival firm experiences a negative stock return when the firm is sued. This result suggests that the firm which sues first has a positive wealth effect as the plaintiff firm.

The contribution of this paper is that it explains the impact of a patent lawsuit on shareholder value in the IT industry. The results of our empirical analysis show that some firms which have a vantage position in the patent lawsuit may be a winner. For this reason, preempting the vantage position in a patent lawsuit is most important to increase or at least maintain shareholder value during a patent lawsuit. In recent years, many IT firms have tried to increase their patent competency to gain a vantage position. For example, Google acquired Motorola in August of 2011 and Microsoft acquired AOL's patents in June of 2012. Although these actions would not have a positive effect on shareholder value directly, these actions could increase patent competency. The increased patent competency then protects the firm from patent lawsuits and can also intimidate a rival firm. Hence, the action to increase patent competency can be regarded as one of the way to increase shareholder value.

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